UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS TX 75202-2733

May 31, 2016

Ms. Felicity Dodson
Regulatory Division, CESWG-RD-P
U.S. Army Corps of Engineers
P.O. Box 1229
Galveston, Texas 77553-1229

Dear Ms. Dodson:

The Environmental Protection Agency (EPA) Region 6 has reviewed Public Notice (PN) SWG-2004-02118, dated May 3, 2016. The applicants, Golden Pass Products and Golden Pass Pipeline (referred to herein as GPX), propose to expand their existing Liquefied Natural Gas (LNG) Import Terminal site, to construct a Liquefied Natural Gas Liquefaction Export Facility. The terminal expansion is proposed to include construction of three liquefaction trains and attendant features, to include construction staging areas and a supply dock, referred to as a Materials Offloading Facility (MOF), and pipeline compressor stations. GPX proposes to use their existing pipeline to transport materials to the site, and proposes to install compressor stations to facilitate transport of materials to the Export Terminal site.

The project site is located in the Sabine Neches Waterway, and adjacent wetlands, at 3752 South Gulfway Drive, in Sabine Pass, Jefferson County, Texas. The project can be located on the U.S.G.S. quadrangle map entitled: Port Arthur South, Texas.
Latitude: 29.75820 North; Longitude: -93.92210 West

The PN indicates that the proposed project will result in approximately impacts to 394 acres of vegetated wetlands, including:

- Permanently impact 373 acres of palustrine emergent marsh at the facility site
- Permanently impact 0.4 acres of palustrine forested wetland at the facility site
- Temporarily impact 9.2 acres of palustrine emergent marsh at the facility site
- Temporarily impact 0.1 acres of estuarine emergent marsh at the facility site
- Permanently impact 8 acres of palustrine emergent marsh at the proposed compressor stations
- Permanently impact 0.01 acres of palustrine forested wetland at the proposed compressor stations

- Temporarily impact 4 acres of palustrine emergent marsh at the proposed compressor stations

In addition to these impacts to vegetated wetlands the following dredging/dredged material disposal is proposed:

- Approximately 2.3 million cubic yards (cy) of maintenance material is proposed to be dredged from the existing ship slip, in the first dredging cycle
    - Approximately 1.5 million cy of material is proposed to be used in the Texas Parks and Wildlife Department's (TPWD) J. D. Murphree Wildlife Management Area (JDMWMA) for marsh restoration activities associated with the Compensatory Mitigation Plan.
    - The rest of the material would be placed into the previously authorized Dredge Material Placement Areas (DMPAs) 5, 8, 9, and 11.
    - Under their current ship slip maintenance dredging permit, GPX is authorized to remove a maximum of 900,000 cy of maintenance dredge material per year, with placement into DMPAs 5, 8, 9, and/or 11, depending on capacity and availability.
- GPX proposes to dredge 455,450 cy of new work material to construct the MOF, access channel, and temporary float channels.
    - Material is expected to consist of primarily clays, with some intermixed layers of sandy clays and silts. According to the PN, this material is not suitable for beneficial use (BU) in the JDMWMA.
    - Therefore, it is proposed to be placed into DMPAs 8 and/or 9, depending on capacity and availability.
- GPX proposes to dredge a maximum of 45,000 cy of maintenance material annually, from the MOF and access channels, after initial construction.
    - This material is also proposed to be placed into DMPAs 8 and/or 9. The float channels will not be maintained, and will be allowed to return to pre-construction contours naturally.
- Authorization to conduct maintenance dredging of the existing ship slip, was issued on October 29, 2009, and will expire on December 31, 2019, under permit SWG-2004-02118. Authorized DMPAs are 5, 8, 9, and 11.

The project site is located on an undeveloped tract of land adjacent to the GPX terminal facility, the Sabine Neches Waterway, and the JDMWMA. GPX has stated that they have avoided and minimized the environmental impacts by locating the facility adjacent to the existing terminal facility, to minimize the need for construction of new facilities. GPX considered several alternatives.

The applicant proposed to mitigate for the proposed impacts associated with construction of the Liquefaction Facility, and compressor station at Mile Post 1, by restoring and enhancing 721.04 acres of tidally influenced coastal marsh within the JDMWMA. The proposed work plan involves placement of dredged material, from the ship slip, to raise the grade of subsided sections of marsh, followed by planting of native, desirable, species.

To compensate for impacts associated with construction of the compressor station at Mile Post 33, GPX proposes to purchase 0.339 functional credit units (FCUs) from the Piney Woods Mitigation Bank. The breakdown of FCUs is as follows: 0.11 of Temporary Storage FCUs; 0.27 of Habitat FCUs; 0.13 of Chemical FCUs.

This application is being reviewed pursuant to Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act (CWA).

The following comments are being provided for use in reaching a decision relative to compliance with the EPA's *404(b)(1) Guidelines for the Specification of Disposal Sites for Dredged or Fill Material* (40 CFR Part 230):

We have been coordinating with the applicant since at least May 2014. We previously commented on the draft Resource Reports, the Draft Wetland Functional Assessment Report, the Administrative Draft Environmental Impact Statement (ADEIS), the draft Mitigation Plan, the 2010 and 2015 dredged material testing reports, and the Draft Environmental Impact Statement (DEIS). We also provided unwritten comments on the telephone and in meetings, and informal comments via emails. While some of our concerns have been addressed, several significant issues we have raised previously have not been addressed.

Practicable Alternatives and Demonstration of Adequate Impact Minimization

In our opinion, the alternatives analysis provided with the PN is far too brief to meet the requirements of the Guidelines for a project as large and as complex as this one. The alternatives analysis provided with the DEIS is more comprehensive and more detailed than the one provided with the PN, but has several problems, including:

- Impacts to aquatic resources specifically, do not appear to have been a criterion in the analysis.
- Alternatives that would appear to have less wetland impacts do not appear to have been analyzed for wetland impacts.
- The fact that the proposed alternative is farther along in the regulatory approval process than other alternatives was used as an important factor to eliminate alternatives.

Direct, Secondary, and Cumulative Impacts and Evaluation of Potential for Significant Degradation

The proposed facility expansion will directly impact 376 ac of primarily palustrine emergent marsh, permanently, and twelve acres, temporarily. This is a large area of wetland impacts. We seldom see wetland impacts this large by individual projects.

While the quality of these wetlands varies considerably, including a significant area that would be considered to be of relatively low quality, some of the marsh that will be impacted is of relatively high quality.

We assume that the wetland impacts provided in the PN are accurate. They are not the same as those provided in the DEIS. We request the applicant clarify whether the impacts to aquatic resources given in the table in the PN are accurate.

Dredged Material Disposal

Most of our previous concerns regarding dredged material quality, specifically with respect to contaminants, appear to have been resolved due to the results of the 2015 sampling and analysis, and our recent finding that the 2010 dredged material data had data quality issues, which rendered them unusable for the purpose of making a determination regarding the acceptability of the proposed dredged material disposal for marsh creation. However, this also means that the previous decision that the dredged material from the Golden Pass Ship Slip, was acceptable for disposal on the J.D. Murphree Wildlife Refuge for marsh creation, was based on unusable contaminant data.

However, we recently learned that the applicant proposes to dredge some locations (Material Offloading Facility (MOF), access channel, and temporary float channels) for which the dredged material has not been tested. We recommend dredged material from these locations be tested for contaminants, as per the Inland Testing Manual, prior to issuance of the permit.

Cumulative Impacts

The cumulative impact analysis included in the DEIS did not include a number of actions that we believe should be included for their impacts to coastal wetlands here. Examples include the Gulf Intracoastal Waterway, the Sabine-Neches Waterway, and its various enlargements over time, the historic railroad that affected the wetlands in the vicinity of the facility, Keith Lake Fish Pass, oil and gas production (fluid withdrawal induced subsidence, accidental impoundment), the development of the chemical industry, and impoundment for wildlife management, among others. In addition, the cumulative impact analysis did not address the question of the cumulative impact of similar existing and proposed facilities along the Louisiana and Texas Gulf Coast. Given the proliferation of similar facilities recently, it would seem to be particularly important to consider whether these facilities are having a cumulative impact on the estuaries and wetlands of the northern and northwestern Gulf of Mexico.

Identification of LEDPA

Considering the questions that still remain regarding the alternatives analysis, and associated potential opportunities for avoidance and minimization of wetlands impacts, it is not clear to us that the applicant's proposed project is the LEDPA. Only the LEDPA can be permitted.

Determination of Adequate Compensation

Our most serious concerns with the proposed project involve the applicant's proposed mitigation. We have previously commented on these concerns. Our comments for the issues below have still not been addressed.

- Out of kind mitigation is proposed without justification.
- Proposed mitigation wetlands will not last as long as would impacted wetlands, if they were not impacted.
- The applicant has not been clear regarding the proposed mix of wetlands and open water in their proposed mitigation acreage. At times, the applicant has implied that the proposed mitigation acreage is to be a mix of wetlands and water. If this is the case, this would not constitute a wetland acre-for wetland acre approach to mitigation.
- The applicant has not provided wetland design and construction information for review and comment.
- The proposed performance standards are not acceptable.
- The proposed monitoring and reporting protocols are not acceptable.

In summary, for the reasons given above, we recommend denial of the permit, as proposed, until our comments have been addressed. If you have any questions on these comments, please contact Ken Teague of my staff at 214-665-6687.

Sincerely yours,

Maria L. Martinez
Chief
Wetlands Section

cc: Rusty Swafford, NOAA
Donna Anderson, USFWS
Heather Biggs, TPWD
Leslie Savage, TRRC
TCEQ

Enclosure

Enclosure
Detailed Comments
GPX (SWG-2004-02118)

The following comments are being provided for use in reaching a decision relative to compliance with the EPA's 404(b)(1) Guidelines for the Specification of Disposal Sites for Dredged or Fill Material (40 CFR Part 230):

We have been coordinating with the applicant since at least May 2014. We previously commented on the draft Resource Reports, the Draft Wetland Functional Assessment Report, the Administrative Draft Environmental Impact Statement (ADEIS), the draft Mitigation Plan, the 2010 and 2015 dredged material testing reports, and the Draft Environmental Impact Statement (DEIS). We also provided unwritten comments on the telephone and in meetings, and informal comments via emails.

While some of our concerns have been addressed, several significant issues we have raised previously have not been addressed:

Practicable Alternatives and Demonstration of Adequate Impact Minimization

The alternatives analysis provided in the PN is extremely brief, and does not reflect the scope of alternatives considered in the DEIS. The DEIS included consideration of "system alternatives", including potential alternatives far removed from the proposed location. We question whether it is appropriate for the Clean Water Act Section 404 permit application to be based on an alternatives analysis with a much narrower scope, than the alternatives analysis presented in the DEIS.

And while we recommend the alternatives analysis done to meet the Guidelines be expanded in scope to include some of the alternatives considered in the DEIS, we have a number of concerns for the alternatives analysis that was included in the DEIS, which are relevant if efforts to meet the requirements of the Guidelines look to the alternatives analysis in the DEIS. The alternatives analysis in the DEIS did not provide any details regarding the basis for the conclusion, in every case, that all alternatives considered, with the exception of the preferred alternative, "…would likely result in environmental impacts similar to or greater than those of the Terminal Expansion." In all cases, little or no explanation was provided. It is not clear that any analysis was actually done. We recommend the alternatives analysis used to meet the requirements of the Guidelines be based on, at a minimum, consideration of differences in the extent of wetland impacts for a range of alternatives, based on NWI data.

Our cursory review suggests that several of the alternatives considered in the DEIS could have considerably less impact to wetlands than the proposed alternative, including Cameron LNG, Lake Charles LNG, Corpus Christi Liquefaction Project, SCT&E LNG Export Project, G2 LNG Project, Texas LNG Project, Annova LNG Brownsville Project, and Rio Grande LNG Export Project. However, the latter three alternatives may have ESA issues, and mitigation is more of a challenge in the Brownsville, Texas area, than it is in the area of the proposed alternative. These alternatives were not included in the alternatives considered in the PN. With the exception of

those alternatives that are known to have serious threatened and endangered species concerns, we recommend these be considered as part of the alternatives analysis required by the 404(b)(1) Guidelines (Guidelines).

Note that the DEIS simply stated that these alternatives would have similar or greater environmental impacts (as opposed to wetland impacts specifically) than the preferred alternative. Our independent analysis suggested that wetland impacts of some of these alternatives might be less than those of the proposed alternative.

In addition, we believe that one of the criteria that was consistently used to eliminate alternatives in the alternatives analysis in the DEIS, "…the permitting and authorization processes necessary for constructing and operating the additional facilities would substantially delay meeting the anticipated timeline for the Terminal Expansion," is inappropriate. By definition, any alternative, to almost any proposed project, will require more time to complete due to the project sponsor's efforts on their proposed project having begun earlier than any other alternative. We recommend this argument not be used in the alternatives analysis used to meet the requirements of the Guidelines.

The alternatives analysis provided in the DEIS did not, in our opinion, meet the requirements of the Clean Water Section 404(b)(1) Guidelines (Guidelines). The alternatives analysis in the DEIS uses environmental impacts generally rather than impacts to aquatic resources and wetlands, specifically, as criteria to eliminate alternatives. While this is appropriate for NEPA purposes, it is not sufficient for compliance with the Guidelines. While environmental impacts generally, should be considered in the alternatives analysis required to meet the Guidelines, avoidance and minimization of wetlands impacts must be a primary criterion. Furthermore, the DEIS does not define environmental impacts, nor does it provide any details or documentation of how they were able to conclude, in every case, that alternatives "…would likely result in environmental impacts similar to or greater than those of the Terminal Expansion" (see above).

<u>Direct, Secondary, and Cumulative impacts and Evaluation of Potential for Significant Degradation</u>

Direct Impacts
Vegetated Wetland Impacts
Facility Site

The proposed facility expansion will directly impact 376 ac of primarily palustrine emergent marsh, permanently, and 12 acres, temporarily. This acreage includes impacts to smaller areas of palustrine forested wetlands and scrub-shrub wetlands. This is a large area of wetland impacts. We seldom review public notices for projects that are expected to impact this much wetland area.

While the quality of these wetlands varies considerably, including a significant area that would be considered to be of relatively low quality, much of the marsh that will be impacted is of relatively high quality.

These wetlands are comprised primarily of palustrine emergent marsh (PEM), with small areas of scrub-shrub (PSS) and forested wetlands (PFO).

The site has been previously impacted by historic dredged material disposal along the Port Arthur Channel along the north and east sides of the site, by State Highway 87 on the south side of the site, and by the existing Golden Pass facility to the west.

The historic dredged material disposal would have converted existing wetlands along the channel to uplands. Presumably, existing depressional wetlands on the old spoil have formed within these uplands over time. These depressional wetlands consist of vegetative communities largely indicative of disturbed conditions. Some of the palustrine emergent marshes on the slope of the dredged material disposal area consist of vegetative communities similar to high marsh or wet prairies farther south on the Texas coast.

Construction of Highway 87 would have eliminated wetlands along its footprint, and would also have altered hydrology of the wetlands to the north, likely largely impounding them. However, these wetlands were probably somewhat naturally isolated hydrologically due to their landscape position between cheniers. Some of these wetter marshes are otherwise of relatively high quality, while others have become dominated by *Typha*.

We assume that the wetland impacts provided in the PN are accurate. They are not the same as those provided in the DEIS. We request the applicant clarify whether the impacts to aquatic resources given in the table in the PN are accurate.

Where is the fill material, proposed to be placed on the facility expansion site, proposed to be borrowed from? Does the excavation of this fill material impact any aquatic habitats? If so, we recommend EPA be provided additional opportunity to review the responses to these questions, and provide recommendations to the Corps.

The DEIS, in the Executive Summary, states that 8.9 acres of wetlands that would be impacted at the facility expansion site, would be temporary. The applicant stated that these wetlands would "be allowed to revert to preconstruction conditions". We recommend the applicant be required to monitor key wetland indicators for these areas prior to impact, and following impact, and if they don't "revert to preconstruction conditions" within one year, the applicant should be required to actively restore these areas. If restoration is necessary, we recommend the applicant be required to monitor the sites until they "revert to preconstruction conditions". Finally, we recommend the applicant be required to mitigate for temporal losses in wetland functions.

Compressor Stations

According to the PN, approximately 8 acres of PEM and 0.014 acres of PFO would be permanently impacted, and 4 acres of PEM would be temporarily impacted, by the proposed project at these locations.

Dredged Material Disposal

Most of our previous concerns regarding dredged material quality, specifically with respect to contaminants, appear to have been resolved due to the results of the 2015 sampling and analysis, and our recent finding that the 2010 dredged material data had data quality issues, which rendered them unusable for the purpose of making a determination regarding the acceptability of the proposed dredged material disposal for marsh creation. However, this also means that the previous decision that the dredged material from the Golden Pass Ship Slip, was acceptable for disposal on the J.D. Murphree Wildlife Refuge for marsh creation, was based on unusable contaminant data.

If dredged material for construction of the mitigation marshes is dredged and placed more than three years from the date of last testing (July, 2015), we recommend the dredged material be retested prior to use for marsh creation/nourishment.

We recommend dredged material from the Material Offloading Facility (MOF), access channel, and temporary float channels be tested for contaminants, as per the Inland Testing Manual, prior to issuance of the permit. We recommend dredged material testing results be used in the application process, rather than testing being a post-permit activity. The purpose for dredged material testing is to determine compliance with the Guidelines and consistency with the state water quality criteria. Those processes are supposed to occur prior to permit issuance. We also recommend the permit include a condition requiring dredged material testing, and review of the testing results by the Corps, EPA, TCEQ, and any other interested agencies, prior to any subsequent disposal of maintenance dredged material from the MOF. If such testing shows no concerns after three dredging cycles, we would agree to reduction in the frequency of dredged material testing to once every three years.

We recommend that in the future Golden Pass exercise care in their request for chemical analysis of sediment and water samples, ensuring that all necessary contract specifications are in place to guard against data quality problems such as those experienced with the 2010 dredged material testing data. We also recommend that in the future, Golden Pass either conduct their own review of data quality prior to submitting it for use in decision-making by agencies, or contract for that service.

Because the 2010 data cannot be used for decision-making due to data quality issues, we recommend the dredged material that was previously placed on the JDMWMA, be tested for contaminants. While that action is not the subject of the pending decisions, it is closely related to them, and our efforts to determine the potential impacts of essentially repeating that previous effort (e.g. marsh creation using dredged material), has revealed that key portions of the data that was used to evaluate that effort, were not usable for making the determination regarding whether or not the proposed placement of that dredged material was acceptable.

Similarly, while it may not be the subject of this public notice, we recommend subsequent maintenance dredged material from the Ship Slip be tested for contaminants, and the results should be reviewed by the Corps, EPA, TCEQ, and any other interested agencies, and the

information should be used by the Corps and TCEQ to ensure that the permittee remains in compliance with the dredged material discharge permit.

Cumulative Impacts

The cumulative impact analysis included in the DEIS did not include a number of actions that we believe should be included for their impacts to coastal wetlands here. Examples include the Gulf Intracoastal Waterway, the Sabine-Neches Waterway, and its various enlargements over time, the historic railroad that affected the wetlands in the vicinity of the facility, Keith Lake Fish Pass, oil and gas production (fluid withdrawal induced subsidence, accidental impoundment), the development of the chemical industry, and impoundment for wildlife management, among others. We recommend the Corps complete a cumulative impact analysis of broad scope, and rigorous detail.

We disagree with the DEIS's limited area for analysis of cumulative impacts to wetlands. We recommend the Corps analyze Golden Pass's contribution to cumulative impacts to wetlands at multiple spatial scales, including Sabine Lake estuary, the Texas coast, and the northwestern Gulf of Mexico coast (Louisiana, Texas).

Identification of LEDPA

Considering the questions and comments that still remain regarding the alternatives analysis, and associated opportunities for avoidance and minimization of wetlands impacts, it is not clear to us that the applicant's proposed project is the least environmentally damaging practicable alternative (LEDPA).

Determination of Adequate Compensation

While the PN did not include any information regarding the applicant's proposed mitigation, we previously reviewed a draft mitigation plan submitted by the applicant to us. Our most serious concerns with the proposed project involve the applicant's proposed mitigation. We have previously commented repeatedly on these concerns. Our comments have not been addressed.

The draft mitigation plan states that, if the Corps deems it necessary, Golden Pass and Texas Parks and Wildlife Department will create and implement appropriate financial assurances. We recommend Golden Pass provide a description of financial assurances that will be provided and how they are sufficient to ensure a high level of confidence that the compensatory mitigation project will be successfully completed, in accordance with its performance standards (see §230.93(n)). We recommend financial assurances in an amount equal to the cost of the proposed mitigation effort, including dredging and containment, in the event the proposed mitigation fails or is insufficient. Note that we believe the current proposal includes considerably more uncertainty than do typical marsh creation projects conducted in Louisiana within a restoration

context. In addition, certainty is more important in a regulatory mitigation context, than it is in a restoration context.

Mitigation for Facility Impacts

The proposed mitigation is out of kind. While it can be argued that trading low-to-moderate quality palustrine emergent marsh for relatively high-quality estuarine brackish tidal marsh, is a good trade, we don't believe the same can be said for trading higher-quality palustrine emergent marsh for high quality estuarine brackish tidal marsh. We recommend the applicant provide detailed supporting arguments, for why the proposed out of kind mitigation should be accepted as compensation for unavoidable impacts to wetlands. While we are requesting arguments in support of both situations as described above, we are particularly interested in arguments that might support the latter trade.

The proposed mitigation wetlands will be lost at a much higher rate than will the impacted wetlands. This will eventually result in insufficient mitigation at some point in the future. One way this problem could be overcome, would be to commit to wetland/water mapping (monitoring) of the mitigation area at approximately ten year intervals, for as long as the impact site wetlands are estimated to last, in the absence of the proposed project. When the wetland acreage in the mitigation area falls below that which has been determined to be required to mitigate for unavoidable impacts at the project site, then additional marsh creation should be undertaken, so that the mitigation wetland lasts as long as the impact site wetlands would be expected to last.

The applicant should be required to clarify how many acres they are proposing to restore and how many acres they are proposing to enhance as their required compensatory mitigation. In addition, they should be required to define what they mean by "enhance", specifically. This should be done prior to permit issuance, and EPA and other agencies should be provided the opportunity to review the definition, and determine whether it meets mitigation requirements. Presumably, the applicant considers "enhancement" in this case to mean what others in coastal restoration call marsh nourishment, in which dredged material is placed on existing wetlands rather than in open water, with the effect being to nourish the existing marsh, and thereby presumably decrease its loss rate, versus outright marsh creation in open water. If this is not what the applicant means by enhancement, they should explain it. The applicant's proposed mitigation should be re-reviewed following the requested clarifications. These requested clarifications may have very significant implications for determining whether or not the unavoidable impacts will be fully compensated.

It is clear that the impacted wetlands are almost exclusively, if not exclusively, solid marsh. On the other hand, it is not clear whether the mitigation acreage proposed is acres of wetland only, or a mix of wetland and water. While an appropriate mix of wetland and water, interspersed in appropriate patterns, is probably more desirable ecologically than a solid marsh, it is important that acres of wetland aren't being exchanged for mixed wetland/water acres. In other words, if the mitigation wetland is a mix of marsh and water, the acreage necessary for full compensation

will be higher than if it was solid wetland, regardless of other possible multipliers based on function.

We recommend the applicant clarify whether the acreage of proposed restored mitigation marsh is based on wetlands only, or whether it is intended to explicitly include a mix of wetlands and water. If the latter, clarify whether the number of acres of mitigation was increased to account for this. If it was not, we recommend that Golden Pass be required to do so. Regardless of whether the mitigation is a mix of wetland and water, the actual acreage of wetland proposed as mitigation should be a multiplier that is a function of the actual acreage of wetland to be impacted, and implications of any functional assessment done.

In addition to whether or not the applicant has explicitly planned for mitigation wetlands to be a mix of wetlands and water, versus whether or not that ends up being the case regardless of plans, we recommend the applicant be required to mitigate acre for acre for wetlands impacts. So, even if the applicant is not planning to create/restore a mix of wetlands and water, but that is the result of their marsh creation/restoration activities, we recommend the applicant be required to fully mitigate for wetland impacts, wetland acre for wetland acre, and not wetland acre for wetland/water acre.

Generally, if there is a time lag between wetland impacts due to project construction (either facility or pipeline), and mitigation completion, additional mitigation for temporal losses in function should be provided. We recommend the applicant be required to mitigate for any temporal losses in wetland function due to project wetland impacts.

The current plans lack sufficient detail for EPA to have confidence that adequate mitigation will be provided. For EPA to have confidence that adequate mitigation will be provided using the proposed approach, we request the following:

- Clarity and specificity regarding the dredged material placement footprint.
- Clarity and specificity regarding the current wetland/water acreages at the proposed mitigation site.
- Clarity regarding whether or not dredged material will be confined during settlement.
- A clear target elevation (or range) for created wetlands, along with an estimate of when this target will likely be achieved, and estimated future elevations. We recommend the elevation target be based on a careful survey of the elevation of nearby healthy reference marsh, of the same type proposed to be created.
- A clear initial construction target elevation.
- Estimates of how many acres of wetlands are likely to occur in the mitigation area (and impact area) at specific points in time in the future. For example, 3, 5, 10, 20, and 50 years in the future (based on landloss rates).
- Estimated dredged material volumes proposed to be discharged at mitigation areas.
- Clarity regarding whether any containment dikes will be degraded (recommended) or gapped (acceptable) in the future, and an estimate of when this might occur. While containment dikes are highly desirable as a means of ensuring marsh creation acreage and elevation, any tidal marsh created within containment dikes that are not degraded or gapped, are not fully ecologically functional.
- Elevation/bathymetry survey data, settlement curves.

- Detailed information regarding plantings, including species to be planted, types of transplants, and planting density.

We recommend that plans to avoid the existing oil and gas canal in/adjacent to the proposed mitigation area, be reconsidered. Oil and gas canals represent opportunities for wetland restoration. Oil and gas canals are significant direct, and indirect causes of coastal wetland loss. The spoil banks adjacent to these canals contribute to the negative effects by altering wetland hydrology. Therefore, in addition to simply filling the canals, backfilling them with soil from the existing spoil banks is preferred, in order to restore wetland hydrology.

We question the conclusion that dredged material from the Material Offloading Facility and the access channels is not suitable for marsh creation or nourishment. We have participated in the planning and/or review of a number of marsh creation projects in Louisiana, and we would not consider this material unsuitable for use for marsh creation. However, we understand the landowner may have their own preferences regarding this.

Performance Standards

The proposed performance standards are not acceptable, in our opinion.

- No consideration appears to have been given to wetlands that already occur within the proposed mitigation areas. These of course, cannot contribute to meeting the performance standards, unless such standards are stated in terms of function and functional lift.
- No consideration is given to elevation as a performance standard. While portions of marsh platforms that might be created may be high enough to allow marsh vegetation to become established, if they are not of sufficient elevation, vegetative growth and productivity will be depressed due to excessive flooding. Conversely, if a marsh platform (or portions thereof) are too high, they may not constitute wetlands until they have consolidated, compacted, and subsided sufficiently to achieve wetland elevations.
- Neither of these situations is desirable, and they do occur as a result of improperly planned marsh creation. We recommend that target elevations over time, be developed as performance standards. At a minimum, performance standards should be set for initial dredged material placement, and three, five, and ten years following dredged material placement.
- No consideration is given to hydrology (percent time flooded) as a performance standard. The frequency and duration of flooding is a fundamental factor in the success and performance of created/restored coastal wetlands. Reference standards can be derived using data from similar marshes in southwestern Louisiana from the CRMS monitoring system. We recommend that a performance standard be developed for percent time flooded.

- In light of the vegetative community that is proposed as the target of this mitigation, we

recommend that a performance standard for salinity be adopted. We recommend the average annual salinity of the proposed mitigation marsh be 0-11 ppt, based on information in the CWPPRA WVA brackish marsh model (CWPPRA Environmental Work Group 2013).

- An alternative to our proposed elevation, hydrology, and salinity performance standards, could be more robust vegetative performance standards, such as above and below-ground biomass, and plant productivity. In the absence of more robust vegetative performance standards, we recommend the elevation and hydrology performance standards mentioned above.
- No consideration is given to ecological connectivity of the mitigation marsh, with the surrounding wetlands and water, as a performance standard. While to our knowledge, no specific standard exists, we can agree that if there were no obstacles to connectivity between the mitigation marsh and the surrounding marsh and open water, then the mitigation marsh would definitely meet any appropriate performance standard based on this. And conversely, if the mitigation marsh was completely surrounded by levees, it would not. An acceptable performance standard for connectivity lies somewhere in between. We recommend Golden Pass develop a proposal with strong supporting arguments, for review and comment. Obviously, this performance standard would not be applicable until after the initial period of dredged material consolidation and compaction, which may be up to three years following dredged material placement.
- The proposed land/water performance standard is proposed to be met too soon after dredged material placement. After only one year the dredged material will likely still be consolidating and compacting. A more reasonable period for meeting this standard might be after three years. In addition, a more appropriate time frame for meeting this standard could probably be estimated based on land loss rates, and/or the settlement curve. Note that if the proposed mitigation area is expected to meet this standard soon following dredged material placement, it does not bode well for the long term persistence of the mitigation marsh. Finally, in addition, note that we have fundamental concerns with this proposed standard (see above comment).

Monitoring and Reporting Protocols

The proposed monitoring and reporting protocols are not acceptable either, in our opinion.

- While there are some good reasons to monitor created/restored wetland sites only one year after dredged material placement, they are limited to measurements of elevation, and settlement/compaction rates. After only one year the dredged material will not have fully settled, so there is no reason to make other measurements. We recommend waiting three years, or as determined by a formal settlement analysis. Due to the importance of other monitoring needs, we recommend that monitoring after one year be limited to that needed to gage progress of initial settlement. This could be as simple as observing the level of dredged material on a gage placed in the dredged material disposal area prior to filling.

The gage should be surveyed to a known datum after placement.

- How many monitoring plots are proposed? What is the basis for the proposed number of monitoring sites?
- We recommend that aerial photography be used in ways other than those specified. Aerial photography should be used as the basis for mapping and quantifying the acreages of emergent wetland and unvegetated open water, in the mitigation area. This should be done at approximately three years, five years, and ten years following dredged material placement, and every ten years after that (see earlier comment).
- While in more stable wetland settings it is probably acceptable to cease monitoring after performance criteria have been met, on the northern and northwestern Gulf of Mexico coast, including the proposed mitigation area, wetland loss rates are significant, so that when a mitigation wetland meets its performance standards for the first time, it is not reasonable to assume that they will continue to be met into the future. In fact, it is highly likely they will not be met at some point in the not too distant future, in this (and similar) cases. Based on this, we recommend that a low level of monitoring (land/water mapping) be continued in perpetuity, at intervals of ten years, or another interval based on wetland loss rates.
- We recommend that monitoring for plant community species composition and percent cover, be performed annually beginning about three years after dredged material placement, and for an additional five years.
- We recommend that water level and salinity be monitored continuously using gages, from about three years after dredged material placement, and for an additional five years. Water level gages should be surveyed and tied to a known datum. This can be accomplished with a minimum of two gages at each of the two mitigation areas.
- Marsh elevation should be surveyed relative to a known datum at three years following dredged material placement, and at eight years following dredged material placement. Marsh elevation should be compared with water surface elevation to determine percent of time flooded.
- While it makes sense to monitor for SAV during ecological development of the proposed mitigation marsh, it really only makes sense to do so if the area is monitored for SAV prior to placement of dredged material also.

Mitigation for Compressor Station Impacts, Pipeline Impacts, Etc.

The proposed standard approach to restoring wetland impacts from pipeline construction, includes only allowing natural revegetation, or perhaps seeding with an unidentified plant species, presumably for erosion control. This approach may not be very effective in some wetlands. We recommend the applicant be required to monitor natural vegetative recruitment into herbaceous wetlands impacted by pipeline construction, and if natural vegetative recruitment does not result in an appropriate plant community after 1 year, we recommend Golden Pass be required to plant the area with appropriate species of transplants at an appropriate planting density. We also recommend the applicant be required to mitigate for temporal losses in wetland function.

For scrub-shrub or forested wetlands impacted by pipeline construction, we recommend the applicant be required to fully mitigate, in-kind, for such impacts. We do not support credit for conversion to herbaceous marsh.

Similarly, the proposed approach of managing pipeline right of ways by mowing and/or application of herbicides, will result in impacts to wetlands that were crossed by the pipeline. We recommend the applicant be required to mitigate for wetland functions lost as a result of right of way management.

Generally, if there is a time lag between wetland impacts due to project construction (either facility or pipeline), and mitigation completion, additional mitigation for temporal losses in function should be provided. We recommend the applicant be required to mitigate for any temporal losses in wetland function due to project wetland impacts.